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Nota di contenuto	""Contents at a Glance""; ""Contents""; ""About the Author""; ""Chapter 1: Introducing MATLAB and the MATLAB Working Environment""; ""Introduction""; ""Developing Algorithms and Applications""; ""Data Access and Analysis""; ""Data Visualization""; ""Numerical Calculation""; ""Publication of Results and Distribution of Applications""; ""The MATLAB working environment""; ""Help in MATLAB""; ""Numerical Computation with MATLAB""; ""Symbolic Calculations with MATLAB""; ""Graphics with MATLAB""; ""General Notation""; ""Help with Commands""; ""MATLAB and Programming"" ""Commands to Escape and Exit to the MS-DOS Environment""""""Chapter 2: First Order Differential Equations. Exact Equations, Separation of Variables, Homogeneous and Linear Equations""; ""First Order Differential Equations""; ""Separation of Variables""; ""Homogeneous Differential Equations""; ""Exact Differential Equations""; ""Linear Differential Equations""; ""Chapter 3: Higher Order Differential Equations. The Laplace Transform and Special Types of Equations""; ""Ordinary High-Order Equations""; ""Linear Higher-Order Equations. Homogeneous Equations with Constant Coefficients"" ""Non-Homogeneous Equations with Constant Coefficients. Variation of Parameters""""""Non-Homogeneous Equations with Variable Coefficients.

Cauchya€?Euler Equations""; ""The Laplace Transform""; ""Orthogonal Polynomials""; ""Chebychev Polynomials of the First and Second Kind""; ""Legendre Polynomials""; ""Associated Legendre Polynomials""; ""Hermite Polynomials""; ""Generalized Laguerre Polynomials""; ""Laguerre Polynomials""; ""Jacobi Polynomials""; ""Gegenbauer Polynomials""; ""Bessel and Airy Functions""; ""Chapter 4: Differential Equations Via Approximation Methods""
""Higher Order Equations and Approximation Methods""""""The Taylor Series Method""; ""The Rungea€?Kutta Method""; ""Chapter 5: Systems of Differential Equations and Finite Difference Equations""; ""Systems of Linear Homogeneous Equations with Constant Coefficients""; ""Systems of Linear Non-Homogeneous Equations with Constant Coefficients""; ""Finite Difference Equations""; ""Partial Differential Equations""; ""Chapter 6: Numerical Calclus with MATLAB. Applications to Differential Equations""; ""MATLAB and Programming""; ""Text Editor""; ""Scripts""
""Functions and M-Files. Function, Eval and Feval""""""Local and Global Variables""; ""Data Types""; ""Flow Control: FOR Loops, WHILE and IF ELSEIF""; ""The FOR Loop""; ""The WHILE Loop""; ""IF ELSEIF ELSE END Loops""; ""Switch and Case""; ""Continue""; ""Break""; ""Try ... Catch""; ""Return""; ""Subfunctions""; ""Ordinary Differential Equations Using Numerical Analysis""; ""Eulera€?s Method""; ""Heuna€?s Method""; ""The Taylor Series Method""; ""Chapter 7: Ordinary and Partial Differential Equations with Initial and Boundary Values""; ""Numerical Solutions of Differential Equations""
""Ordinary Differential Equations with Initial Values""

Sommario/riassunto

MATLAB is a high-level language and environment for numerical computation, visualization, and programming. Using MATLAB, you can analyze data, develop algorithms, and create models and applications. The language, tools, and built-in math functions enable you to explore multiple approaches and reach a solution faster than with spreadsheets or traditional programming languages, such as C/C++ or Java. MATLAB Differential Equations introduces you to the MATLAB language with practical hands-on instructions and results, allowing you to quickly achieve your goals. In addition to giving an introduction to the MATLAB environment and MATLAB programming, this book provides all the material needed to work on differential equations using MATLAB. It includes techniques for solving ordinary and partial differential equations of various kinds, and systems of such equations, either symbolically or using numerical methods (Euler’s method, Heun’s method, the Taylor series method, the Runge–Kutta method,…). It also describes how to implement mathematical tools such as the Laplace transform, orthogonal polynomials, and special functions (Airy and Bessel functions), and find solutions of finite difference equations.